

MONITORING OF AIR QUALITY IN HANI ELEZIT DURING OF YEAR 2016

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ABSTRACT

The municipality of Hani Elezit is located in the southern part of Kosovo, with an area of 82.9 km². This municipality was founded after the end of the recent war and full decentralization in Kosovo. The municipality of Hani Elezit is known as a country of industrial production and has all the preconditions for air pollution. As the main cause of pollution in the municipality of Hani Elezit are: The Cement Sharrcem Factory, road transport, urban and industrial waste dumps (with different local impact), wood and lignite for house heating. Since pollutants in the air do not know the boundaries, the biggest concerns are; Volatile organic compounds (VOCs), CO₂, NO_x, CO, sulphur compounds SO₂, PM₁₀, PM_{2.5} etc. During this study we have presented the monitoring of air quality in the municipality of Hani Elezit, where the air quality analyses were taken by Kosovo Hydrometeorological Institute (KHI) for the whole year 2016, measuring these parameters SO₂, CO, O₃, PM₁₀ and PM_{2.5}. All these being measured (µg/m³), and always in compliance with the Directive (2008/50 / EC) and Law for Air Protection from Pollution (No. 03 /L-160).

Keywords: Air, Pollution, CO, SO₂, O₃, PM₁₀, PM_{2.5}.

INTRODUCTION

The municipality of Hani Elezit is located in the southern part of Kosovo, with an area of 82.9 km² (Municipal Development Plan, 2011). Pollution is a qualitative and quantitative change of air, water, soil and food (Roxhaja D, & Jablanovic M, 1983). This pollution is mainly caused by human activities, but it can also be a result of natural disasters. All living organisms in the ecosystem are attacked by pollution, making practically impossible the viability of life (Patronas D, et al., 2009), (Hutton G, 2011). One of the major problems of air pollution is the collection of those dangerous substances in the atmosphere which substances endanger the lives of people and other living things. As the biggest pollutants are: CO₂, NO_x, CO, SO₂, PM₁₀ and PM_{2.5} suspended particulate emissions, where sources include: industries, transportation, households, wastewater, waste, agriculture, pesticides and volcanic activities. The main polluter in the city of Hani Elezit is Sharrcem factory, located 200 m near the Kosovo cross border with Macedonia. This plant is located near the Mergeles mine and is divided by the highway Pristina-Skopje. This paper aims to show the air quality of Hani Elezit, also to advance the level of information about air quality of Hani Elezit, which in recent years is in great pressure from pollution (household, industry, transportation, etc.)

MATERIAL AND METHODS

Air quality monitoring in Hani Elezit takes place between the monitoring station located in the yard of "Ilaz Thaçi" High School, in this town, managed by the Kosovo Hydro meteorological Institute (KHI). In this paper we will refer to the results of the station located in the town of Hani i Elezit. Through this station, these parameters are monitored: SO₂, O₃, CO, PM₁₀ and PM_{2.5}. The automatic air quality monitoring station has been installed by the Kosovo Hydrometeorological Institute (KHI), which is equipped with an automatic analyzer for Sulphur dioxide (SO₂), Carbon monoxide (CO), Ozone (O₃) and Particulates matters (PM₁₀, PM_{2.5}).

During the monitoring of air quality for the determination of concentrations of air pollutants, are used standard methods for the measurement of air pollutants.

Sulphur dioxide (SO₂), is determination by ultraviolet fluorescent-EN 14212. Carbon monoxide (CO) is defined by non-dispersive infrared spectroscopy EN 14626. Ozone (O₃) is determination by ultraviolet photometer EN 1462. PM_{2.5} and PM₁₀ particles are determination by beta attenuation (Sharp) EN 12341 and optical measures (Grimm M180).

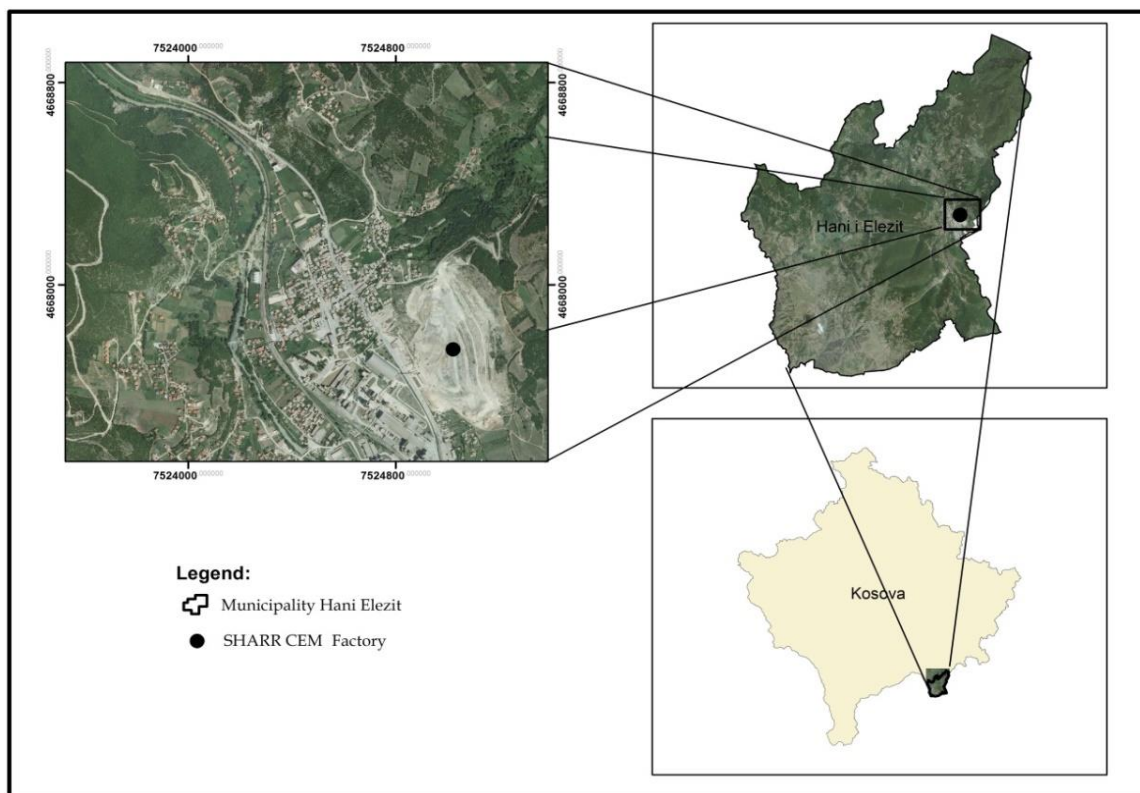


Figure 1: Geographical position of Hani i Elezit and Sharrcem facory

RESULTS AND DISCUSSION

The results presented below are taken from automatic measurements of air pollutant parameters for 2016, mathematical averages are extracted, analysed and processed to give an estimate of air quality status in the monitoring area. It is worth pointing out that the assessment of the air quality condition is comparing the values of the results obtained with the standard values allowed following the laws and local regulations in force and according to the directives (Law, 2010), (Directive, 2008).

From our results (Figure 2.) we can see that the concentration of SO_2 does not exceed the Maximum Allowed Rate throughout the year 2016.

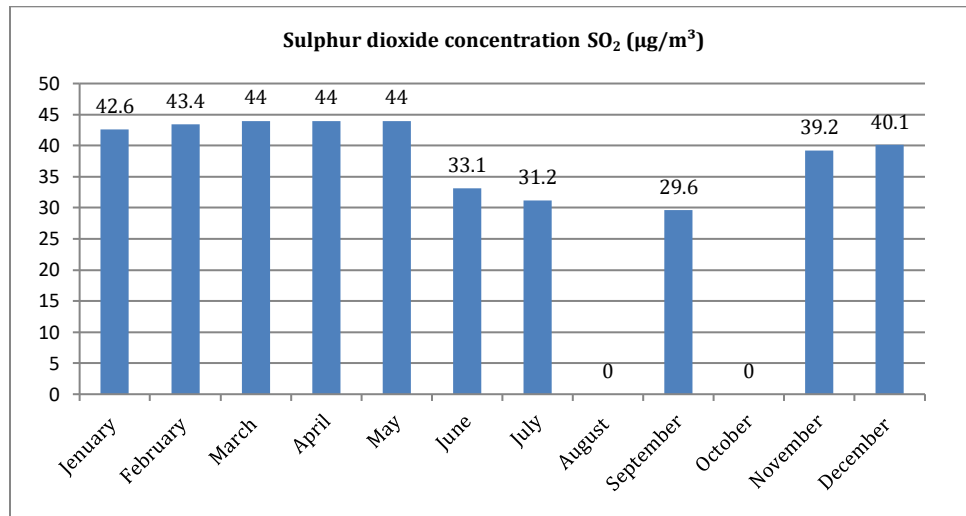


Figure 2: Monthly average value of Sulphur dioxide concentration SO₂ (µg/m³)

Sulphur dioxide is a toxic gas with acidity, colourless and strong odour. The main sources from which this gas is produced are the energy capacities and heaters, which use as crude oil and low quality coal that contain sulphur (Pollozani A, et al., 2009).

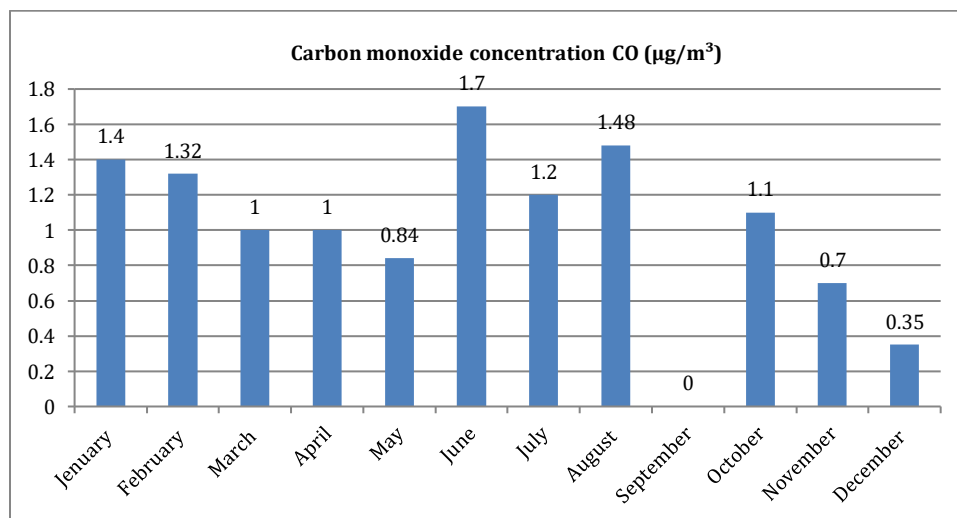


Figure 3: Monthly average value of Carbon monoxide concentration CO (µg/m³)

Our results (Figure 3.) for Carbon monoxide (CO) during 2016 have shown that does not exceed the Maximum Allowed Rate. Carbon monoxide very toxic and combustible. It is mainly a product of incomplete carbon combustion in fuels (Pollozani A, et al., 2009), (Godish Th, 2004).

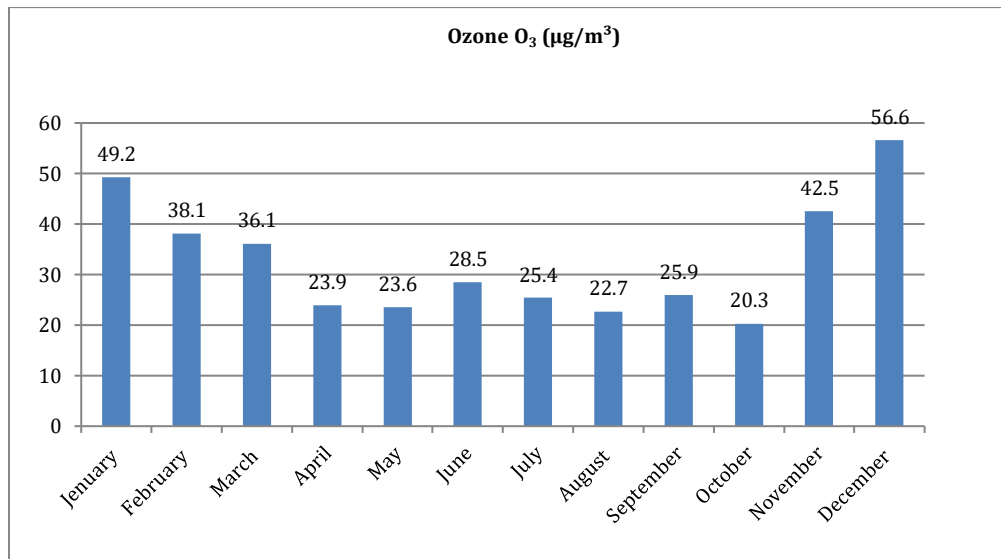


Figure 4: Monthly average value of Ozone O₃ (µg/m³)

Our results (figure 4.) for Ozone (O₃) during 2016 have shown that does not exceed the Maximum Allowed Rate. Ozone (O₃) it is a substance with high toxicity of oxidizing properties and is known as a common pollutant. Ozone is formed in the atmosphere by the reaction between nitrogen oxides, hydrocarbons and sunlight (Pollozani A, et al., 2009), (Daci N, & Daci M, 2014). Many of the electrical equipment, such as televisions, photocopiers and electric motors (using brushes), produce such quantities of ozone as one can easily smell like a odour.

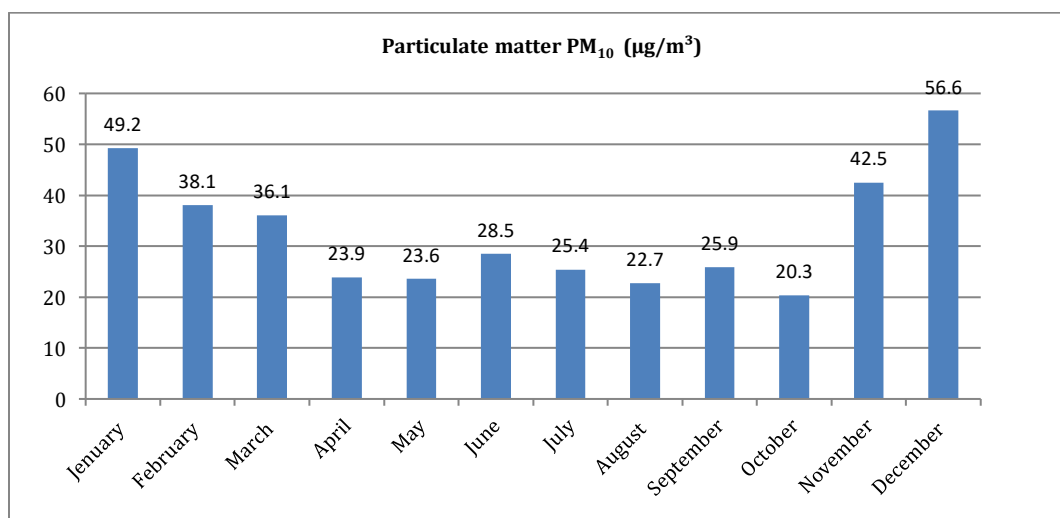


Figure 5: Monthly average value of particulate matter PM₁₀ (µg/m³)

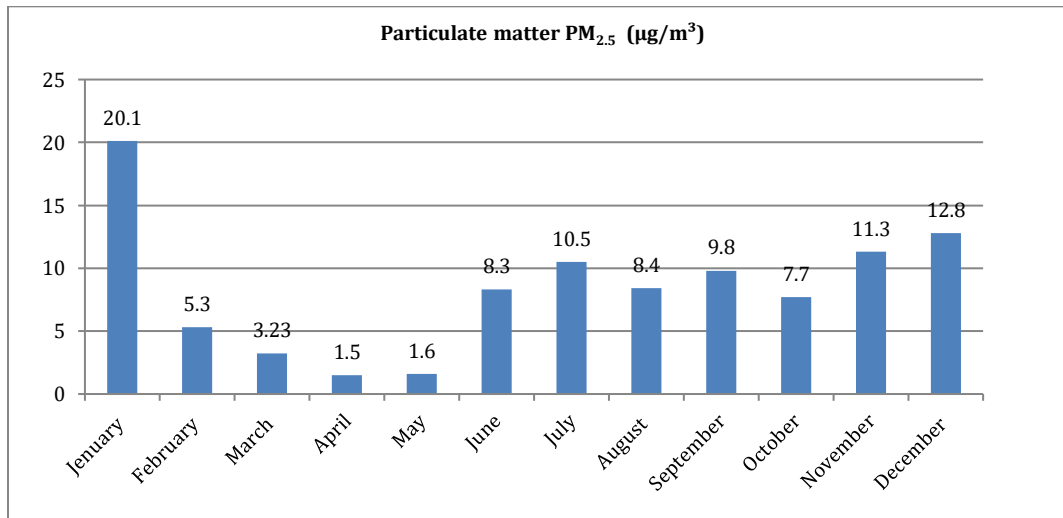


Figure 6: Monthly average value of particulate matter PM_{2.5} (µg/m³)

Particulate matter (PM₁₀ and PM_{2.5}) these are two types of particulate matter are not special compounds but the concentration of suspended dust mass in the air having a diameter less than 10 µm PM₁₀ or a diameter smaller than 2.5 µm PM_{2.5} (Pollozani A, et al., 2009), (Daci N, & Daci M, 2014). These are importance, especially in densely populated locations when these parameters exceed the permitted thresholds or because they may have negative effects on human health. As seen from (Figure 5 and 6) in January, November and December we have exceeded the daily Maximum Allowed Rate.

CONCLUSION

Based on the results obtained in this research can be concluded as follows:

- From results it can be concluded that the high concentrations of PM₁₀ and PM_{2.5}, above permitted values, have affected the air quality in this town to become worse and unsatisfactory.
- This situation contributes to emissions of pollutants from sources such as industry, transportation and consumption of solid fuels used for heating as well as unfavourable meteorological conditions relief where air is monitored.
- During these months of January, November and December, we have seen a rise in values and exceeds the standards form bad weather and fog, (visibility <30 m) and high air humidity over 85%. Also this situation has contribute lack wind, these factor have a impact to creation of the smog situation.
- This condition contributes to the increased difficulty in people who is ill respiratory disease.

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